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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/045,245	03/20/98	CHEN L	SMT4492P0020

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EXAMINER	
NICOLAS, W	
ART UNIT	**PAPER NUMBER**
1741	3

DATE MAILED: 07/09/99

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.	Applicant(s)
09/045,245	Chen
Examiner	**Group Art Unit**
Wesley Nicolas	1741

☐ Responsive to communication(s) filed on _____.

☐ This action is **FINAL.**

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire *3* month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

☒ Claim(s) *1-48* is/are pending in the application.

Of the above, claim(s) _____ is/are withdrawn from consideration.

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) *1-46* is/are rejected.

☐ Claim(s) _____ is/are objected to.

☒ Claims *1-48* are subject to restriction or election requirement.

Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☒ The drawing(s) filed on *Mar 20, 1998* is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐approved ☐disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been

☐ received.

☐ received in Application No. (Series Code/Serial Number) _____.

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____.

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☒ Notice of References Cited, PTO-892

☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____

☒ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

DETAILED ACTION

1. The Applicant should submit any prior art that he is aware of to ensure proper consideration by the Examiner.

2. Claims 1-48 are pending in the case.

Election/Restriction

3. Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 1-46, drawn to an apparatus and process, classified in class 205, subclass 183.

II. Claims 47-48, drawn to an article, classified in class 205, subclass 50.

4. The inventions are distinct, each from the other because of the following reasons: Inventions I and II are related as apparatus/process and product made. The inventions in this relationship are distinct if either or both of the following can be shown: (1) that the apparatus as claimed is not an obvious apparatus for making the product and the apparatus can be used for making a different product or (2) that the product as claimed can be made by another and materially different apparatus (MPEP § 806.05(g)). In this case the product as claimed can be

made by another materially different apparatus in which sputtering or electrodeposition is used to apply the enhancement to the ultra-thin seed layer.

5. The inventions are distinct, each from the other because of the following reasons: The search required for Group I is not required for Group II, restriction for examination purposes as indicated is proper.

6. During a telephone conversation with Randall Erickson on May 27, 1999 a provisional election was made **with** traverse to prosecute the invention of Group I, claims 1-46. Affirmation of this election must be made by applicant in replying to this Office action. Claims 47-48 were withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Drawings

7. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the apparatus as indicated in claims 16-29 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered. It appears as though Fig. 7 has not been submitted with the application.

8. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: reference numeral 21. Correction is required.

Specification

9. The disclosure is objected to because of the following informalities: page 2, line 13 and page 3, line 1 "$V_{sat/}$" should be --V_{sat}--; page 14, line 15 "eexposing" should be --exposing--; page 15, line 6 a comma should be added after "70"; page 16, line 2 "adhere is" should be --adheres--; page 18, line 10 "0.05" should be --0.05M--.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

10. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

11. Claim 1 is rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for electrodepositing, does not reasonably provide enablement for the broader term

of "depositing". The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to practice the invention commensurate in scope with these claims. In this case, Applicant's use a term "depositing" which could encompass processes such as electroless, PVD, and CVD deposition. Applicant's only provide support for the broad term of "depositing" for the application of the ultra-thin seed layer and NOT the seed layer enhancement and therefore the scope should be limited to just electrodepositing as indicated in claim 30.

12. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

13. Claims 1-15 and 27-29 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

For example, in claim 1 Applicant's specify a seed layer "having a thickness at all points on sidewalls of substantially all recessed features distributed within the workpiece that is equal to or greater than about 10 % of the nominal seed layer thickness over an exteriorly disposed surface of the workpiece." It is unclear to the Examiner exactly what this means and where the specific thicknesses are measured from.

Also, in claim 27 which is dependent on claim 20, Applicants add a further layer of copper over the conductive ultra-thin seed layer using an acidic copper bath. Perhaps Applicants

intended to further enhance the enhanced ultra-thin seed layer as outlined in claim 20. If this is the case, Applicant's should add the word "enhanced" after conductive in line 3 of claim 27. Currently the claim does not make sense because after enhancing the ultra-thin seed layer in claim 20, there is no way one can add a different layer onto the ultra-thin seed layer if it is already covered.

Also, claim 9 talks of a "complexing agent" of claim 1, there is no antecedent basis for this limitation in the claim. Perhaps Applicant's intended to make claim 9 dependent on claim 4.

Claims 2-15 and 28-29 are rejected because they are dependent from claims 1 and 27, respectively.

Claim Rejections - 35 USC § 102

14. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless --
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

15. Claims 1-3, and 7 rejected under 35 U.S.C. 102(b) as being anticipated by Farooq et al. (5,549,808).

Claims 1-3 are rejected because Farooq et al. disclose the formation of an interconnect structure wherein an ultra-thin seed layer is formed on a barrier layer, said ultra-thin seed layer having a thickness of about 500 Å, and then the enhancing the ultra-thin seed layer by depositing a metal such as copper by electroplating (col. 4, lines 10-26).

Claim 7 is rejected because Farooq et al. disclose that the thickness of the ultra-thin seed layer is about 500 Å thick (0.05 μm).

16. Claims 16 and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by Dubin et al. (5,882,498).

Claim 16 is rejected because Dubin et al. disclose a means for applying a conductive ultra-thin layer to the surface of a semiconductor workpiece, and a means for electrochemically enhancing the conductive ultra-thin seed layer (col. 3, line 50 to col. 4, line 56).

Claim 17 is rejected because Dubin et al. disclose that the means for applying the ultra-thin copper seed layer is applied onto a barrier layer on the surface of the semiconductor (col. 4, lines 1-3).

Claim Rejections - 35 USC § 103

17. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

18. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

19. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Farooq et al. (5,549,808) as applied to claim 1 above.

Farooq et al. is as applied, argued, and disclosed above and incorporated herein.

Farooq et al. do not specifically state that the seed layer is applied by PVD.

Claim 6 is rejected because it would have been obvious and within the skill in the art at the time the invention was made to have said that the seed layer was deposited by PVD because Farooq et al. disclose that the seed layer is "deposited" and the term "deposited" is a broad term in the art that encompasses such methods as CVD, PVD, electroless, and electroplating.

20. Claims 4-5, 9-10, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Farooq et al. (5,549,808) as applied to claim 1 above, and further in view of Gilton et al. (5,151,168).

Farooq et al. is as applied, argued, and disclosed above and incorporated herein.

Gilton et al. teach the use of an alkaline electroplating bath and the use of a complexing agent (Abstract).

Farooq et al. do not teach plating in an alkaline bath or the use of a complexing agent.

Claim 4 is rejected because it would have been obvious and within the skill in the art at the time the invention was made to have used the alkaline bath of Gilton et al. in the invention of Farooq et al. because when depositing at lower pH values, the metal is more coarsely grained which results in an irregular surface coating (col. 3, lines 59-60) and an increase in surface area.

Claims 5, 9-10, and 12 are rejected because it would have been obvious and within the skill in the art at the time the invention was made to have used the complexing agent of Gilton et al in the invention of Farooq et al. because Gilton et al. disclose a complexing agent such as EDTA prevents the metal ions from precipitating out of solution thereby increasing the efficiency of the process (col. 3, line 54). In addition, it would have been obvious and within the skill in the art at the time the invention was made to have used the alkaline bath of Gilton et al. in the invention of Farooq et al. because when depositing at lower pH values, the metal is more coarsely grained which results in an irregular surface coating (col. 3, lines 59-60) and an increase in surface area. Also, Gilton et al. disclose the complexing agent EDTA in a concentration of between 0.02

and 0.14 molar (col. 5, lines 20-21), which overlaps Applicant's claimed range. When general conditions are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by changing the size, shape, proportion of shape, degree and sequence of added ingredients through routine experimentation. See for example In re Rose, 105 USPQ 137; In re Aller 220F, 2d 454, 105 USPQ 233, 235 (CCPA 1955); In re Dailey et al., 149 USPQ 47; In re Reese, 129 USPQ 402; In re Gibson, 45 USPQ 230. In this case, the specific range would have been dependent on the voltage, temperature, and ionic strength of electrolytic bath, and the desired coating on the substrate.

Claim 8 is rejected because although Farooq et al. disclose a seed layer thickness of 500 Å, the specific seed layer thickness would have been dependent on the intended use of the substrate being made. For example, the thickness of the seed layer determines the electrical conductivity and ultimate thickness of the subsequent plating. If a thin electroplated enhancement was desired, it would have been obvious and within the skill in the art to lay down a thinner seed layer because a thinner seed layer would have limited the ion transfer and therefore limited the thickness of the electroplate and rate of electrodeposition.

Claim 14 is rejected because it would have been obvious and within the skill in the art at the time the invention was made to have added an additional layer by using an acidic bath depending on the intended use of the substrate because Gilton et al. teach that the pH of the electroplating bath will determine the surface structure of the electroplate and also the surface

area (col. 3, lines 59-60), which allows the artist to taylor the specific surface to a specific end use.

21. Claims 30-32, 35-37, 39-40, and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Farooq et al. (5,549,808), and further in view of Gilton et al. (5,151,168).

Farooq et al. is as applied, argued, and disclosed above and incorporated herein.

Gilton et al. teach the use of an alkaline electroplating bath and the use of a complexing agent (Abstract).

Farooq et al. do not teach plating in an alkaline bath or the use of a complexing agent.

Claims 30, 39-40, and 42 are rejected because it would have been obvious and within the skill in the art at the time the invention was made to have used the complexing agent of Gilton et al in the invention of Farooq et al. because Gilton et al. disclose a complexing agent such as EDTA prevents the metal ions from precipitating out of solution thereby increasing the efficiency of the process (col. 3, line 54). In addition, it would have been obvious and within the skill in the art at the time the invention was made to have used the alkaline bath of Gilton et al. in the invention of Farooq et al. because when depositing at lower pH values, the metal is more coarsely grained which results in an irregular surface coating (col. 3, lines 59-60) and an increase in surface area. Also, Gilton et al. disclose the complexing agent EDTA in a concentration of between 0.02 and 0.14 molar (col. 5, lines 20-21), which overlaps Applicant's claimed range. When general

conditions are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by changing the size, shape, proportion of shape, degree and sequence of added ingredients through routine experimentation. See for example In re Rose, 105 USPQ 137; In re Aller supra; In re Dailey et al., supra; In re Reese, supra; In re Gibson, supra. In this case, the specific range would have been dependent on the voltage, temperature, and ionic strength of electrolytic bath, and the desired coating on the substrate.

Claim 31 is rejected because it would have been obvious and within the skill in the art at the time the invention was made to have used the sputtering process of Gilton et al. in the invention of Farooq et al. because Gilton et al. teach of the sputtering of metal layers and sputtering is well known in the art to be a common PVD process which provides conformal coatings without the contamination brought about by CVD processes (col. 4, lines 53-65), thereby increasing the efficiency of the process.

Claim 32 is rejected because Farooq et al. disclose that the thickness of the ultra-thin seed layer is about 500 Å thick (0.05 μm).

Claims 33 and 34 are rejected because although Farooq et al. disclose a seed layer thickness of 500 Å, the specific seed layer thickness would have been dependent on the intended use of the substrate being made. For example, the thickness of the seed layer determines the electrical conductivity and ultimate thickness of the subsequent plating. If a thin electroplated enhancement was desired, it would have been obvious and within the skill in the art to lay down a

thinner seed layer because a thinner seed layer would have limited the ion transfer and therefore limited the thickness of the electroplate and rate of electrodeposition.

Claim 35 is rejected because it would have been obvious and within the skill in the art at the time the invention was made to have used the alkaline bath of Gilton et al. in the invention of Farooq et al. because when depositing at lower pH values, the metal is more coarsely grained which results in an irregular surface coating (col. 3, lines 59-60) and an increase in surface area.

Claims 36-38 are rejected because it would have been obvious and within the skill in the art at the time the invention was made to have provided copper sulfate as a source of copper ions as indicated by Gilton et al. because Gilton et al. teach that copper sulfate is conventionally used as a copper ion source (col. 5, line 16) which is readily available and relatively inexpensive. In addition, Gilton et al. disclose a copper sulfate concentration of between 0.01 and 0.07 molar (col. 5, lines 17-18), which overlaps Applicant's claimed range. When general conditions are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by changing the size, shape, proportion of shape, degree and sequence of added ingredients through routine experimentation. See for example In re Rose, supra; In re Aller supra; In re Dailey et al., supra; In re Reese, supra; In re Gibson, supra. In this case, the specific range would have been dependent on the voltage, temperature, and ionic strength of electrolytic bath, and the desired coating on the substrate. In addition, Examiner deems 0.07 M of copper sulfate to be "about" 0.1 M.

Claim 45 is rejected because it would have been obvious and within the skill in the art at the time the invention was made to have added an additional layer by using an acidic bath depending on the intended use of the substrate because Gilton et al. teach that the pH of the electroplating bath will determine the surface structure of the electroplate and also the surface area (col. 3, lines 59-60), which allows the artist to taylor the specific surface to a specific end use.

22. Claims 15 and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Farooq et al. and Gilton et al. as applied to claims 14 and 45 above, and further in view of Dubin et al. (5,882,498).

Farooq et al. and Gilton et al. are as applied, argued, and disclosed above and incorporated herein.

Dubin et al. is as applied, argued, and disclosed above and incorporated herein.

The Farooq et al. combination does not disclose the specific alkaline bath or an EDTA complexing agent.

Claims 15 and 46 are rejected because it would have been obvious and within the skill in the art at the time the invention was made to have included a rinsing step as disclosed in Dubin et al. (Dubin et al. disclose spinners and polishers which comprise a rinsing step (col. 5, lines 55-65)), because it is well within the skill in the art to keep semiconductor workpieces clean and free of dust particles as evidenced by the well known semiconductor "clean rooms". .

23. Claims 18-23 and 27-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dubin et al. (5,882,498) as applied to claim 16 above, and further in view of Gilton et al. (5,151,168).

Dubin et al. is as applied, argued, and disclosed above and incorporated herein.

Gilton et al. is as applied, argued, and disclosed above and incorporated herein.

Dubin et al. do not disclose the specific alkaline bath or an EDTA complexing agent.

Claim 18 is rejected because it would have been obvious and within the skill in the art at the time the invention was made to have used the sputtering process of Gilton et al. in the invention of Dubin et al. because Gilton et al. teach of the sputtering of metal layers and sputtering is well known in the art to be a common PVD process which provides conformal coatings without the contamination brought about by CVD processes (col. 4, lines 53-65). Although Gilton et al. disclose that the sputtering process is used to deposit the barrier layer, it is the overall structure (i.e. means for sputtering a coating) that is material, not the specific method steps.

Claim 19 is rejected because it would have been obvious and within the skill in the art at the time the invention was made to have used the CVD process of Gilton et al. in the invention of Dubin et al. because Gilton et al. teach that CVD produces layers with high conformality which ensures a more uniform surface coating (col. 4, lines 53-65). Although Gilton et al. disclose that

the CVD process is used to deposit the barrier layer, it is the overall structure (i.e. means for applying CVD coating) that is material, not the specific method steps.

Claims 20, 23 and 28 are rejected because it would have been obvious and within the skill in the art at the time the invention was made to have used the alkaline bath of Gilton et al. in the invention of Dubin et al. because when depositing at lower pH values, the metal is more coarsely grained which results in an irregular surface coating (col. 3, lines 59-60) and an increase in surface area. In addition, it would have been obvious and within the skill in the art at the time the invention was made to have used the complexing agent of Gilton et al in the invention of Dubin et al. because Gilton et al. disclose a complexing agent such as EDTA which prevents the metal ions from precipitating out of solution thereby increasing the efficiency of the process (col. 3, line 54).

Claims 21 and 22 are rejected because the specific pH or voltage range in the apparatus is a method limitation which does nothing to further define the structure in apparatus claims. The apparatus must merely be capable of operating at the specific operating conditions which appears to be the case with the apparatus of Dubin et al. absent evidence to the contrary. The specific pH or voltage would have been considered a result effective variable by one having ordinary skill in the art. As such, one having ordinary skill would have routinely optimized the pH and/or voltage of the bath to obtain the desired deposition attendant therewith. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In re Aller 105 USPQ 233.

Claim 27 is rejected because Dubin et al. disclose an apparatus which is capable of providing further coatings of copper over the conductive ultra-thin seed layer (col. 4, lines 31-56).

Although Dubin et al. do not disclose the specific acidity of the electrolyte solution, it is the overall structure (i.e. electroplating chamber) that is material, not the specific method steps.

Claim 29 is rejected because Dubin et al. disclose other processes such as spinners and polishers which comprise a rinsing step (col. 5, lines 55-65).

24. Claims 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dubin et al. in view of Gilton et al. as applied to claims 16-17, and 20 above, and further in view of Makkaev et al. (4,576,689).

Dubin et al. and Gilton et al. are as applied, argued, and disclosed above and incorporated herein.

Makkaev et al. teach the use of ED (ethylenediamine) or citric acid as a complexing agent in an electrolytic bath (Abstract).

The Dubin et al. combination does not teach the use of ED (ethylenediamine) or citric acid as a complexing agent.

Claims 24-26 are rejected because it would have been obvious and within the skill in the art at the time the invention was made to have used the complexing agent (stabilizing agent) of Makkaev et al. in the invention of the Dubin et al. combination because Makkaev et al. teach the use of ethylenediamine and a use of citric acid (a carboxylic acid) which avoids the oxidation reduction reaction of the metal ions in solution (col. 4, lines 53-55).

25. Claims 9, 11, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Farooq et al. (5,549,808) as applied to claim 1 above, and further in view of Makkaev et al. (4,576,689).

Farooq et al. is as applied, argued, and disclosed above and incorporated herein.

Makkaev et al. teach the use of ED (ethylenediamine) or citric acid as a complexing agent in an electrolytic bath (Abstract).

Farooq et al. do not teach the use of ED (ethylenediamine) or citric acid as a complexing agent.

Claim 9 is rejected because it would have been obvious and within the skill in the art at the time the invention was made to have used the complexing agent (stabilizing agent) of Makkaev et al. in the Farooq et al. invention because Makkaev et al. disclose a complexing agent (stabilizing agent) complexes with the metal ions and prevents the metal ions from undergoing oxidation-reduction reactions, thereby increasing the efficiency of the process (col. 4, lines 53-57).

Claims 11 and 13 are rejected because it would have been obvious and within the skill in the art at the time the invention was made to have used the complexing agent (stabilizing agent) of Makkaev et al. because Makkaev et al. teach the use of ethylenediamine in a concentration of between 0.000066 to 4.14 M and a use of citric acid in a concentration of between 0.000028 and 1.302 M (Abstract) (to calculate molarity one must take into account the molecular weight of the molecule), which avoids the oxidation reduction reaction of the metal ions in solution (col. 4, lines 53-55). When general conditions are disclosed in the prior art, it is not inventive to discover the

optimum or workable ranges by changing the size, shape, proportion of shape, degree and sequence of added ingredients through routine experimentation. See for example In re Rose, supra; In re Aller supra; In re Dailey et al., supra; In re Reese, supra; In re Gibson, supra. In this case, the specific range would have been dependent on the voltage, temperature, and ionic strength of electrolytic bath, and the desired coating on the substrate.

26. Claims 41, 43, and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Farooq et al.- Gilton et al. combination as applied to claim 30 above, and further in view of Makkaev et al. (4,576,689).

The Farooq et al.- Gilton et al. combination is as applied, argued, and disclosed above and incorporated herein.

Makkaev et al. teach the use of ED (ethylenediamine) or citric acid as a complexing agent in an electrolytic bath (Abstract).

The Farooq et al.- Gilton et al. combination does not teach the use of ED (ethylenediamine) or citric acid as a complexing agent.

Claims 41, and 43-44 are rejected because it would have been obvious and within the skill in the art at the time the invention was made to have used the complexing agent (stabilizing agent)

of Makkaev et al. because Makkaev et al. teach the use of ethylenediamine in a concentration of between 0.000066 to 4.14 M and a use of citric acid in a concentration of between 0.000028 and 1.302 M (Abstract) (to calculate molarity one must take into account the molecular weight of the molecule), which overlaps Applicant's claimed range. When general conditions are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by changing the size, shape, proportion of shape, degree and sequence of added ingredients through routine experimentation. See for example In re Rose, supra; In re Aller supra; In re Dailey et al., supra; In re Reese, supra; In re Gibson, supra. In this case, the specific range would have been dependent on the voltage, temperature, and ionic strength of electrolytic bath, and the desired coating on the substrate.

Conclusion

27. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wesley Nicolas whose telephone number is (703)305-0082. The examiner can normally be reached on Mon.-Thurs. from 7am to 5pm.

The Supervisory Primary Examiner for this Art Unit is Kathryn Gorgos whose telephone number is (703) 308-3328.

The fax number for this Group is (703)305-7719.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703)308-0661.

Wesley Nicolas

July 6, 1999

Kathryn Gorgos
Supervisory Patent Examiner
Technology Center 1700